The GARzette

The Official Newsletter of the Gwinnett Amateur Radio Society

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www.GARS.org

Don't forget to support our advertisers at the back of the *GARzette*.

TechFest
Gwinnett Amateur Radio Society

GARS Exhibition of the Technical aspects of Amateur Radio

The next TechFest is early in 2027

GARS GENERAL LICENSE HAM CRAM CLASS

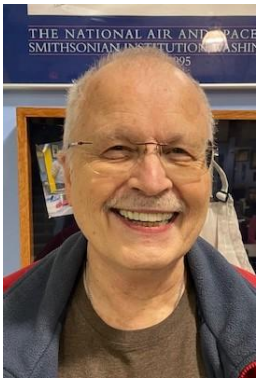
WHEN: Saturday July 25th and Sunday July 26th 2026; 8:00 am to 4:00 pm each day, exams start at 4:00 pm Sunday (this is a CLOSED exam session, only open to registered students of the class).

Please visit https://gars.org for more information, and to register.

GARS Meeting: Meshtastic by by Ed Labra
Tuesday July 14, 2026 at 7:00 PM

President's Message

From the President…



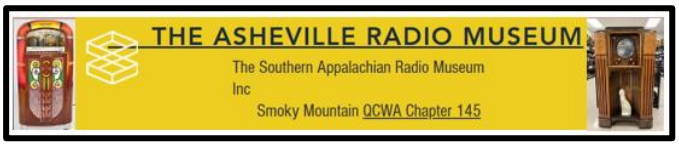
June has been a busy month for me. GARS has 2 events we do each year in June. For our meeting instead of our normal meeting location, we hold it at our Field Day location – Harbins Park. This was our Ice Cream Social. We did have a very short meeting and then nice door prizes. I brought along the door prize tickets after stopping at the EAA 690 Hangar – to pick up the tickets and the drum.

Field Day was held on June 27th & 28th also at Harbins Park. I was there on Saturday and want to thank everyone who came out to help setup the stations, antennas and bring the food and late night ice cream for the late-night operators. There was an additional crew that came to help on Sunday to pack up all of the equipment. Thanks to all!

I and Mark KN2TOD had our DMR setup and also showed off VoxDMR. VoxDMR sends the connection to a repeater that distributes it to a central location for distribution to all entities wishing to listen to the connection. One needs to have a valid FCC license to use VoxDMR. Some think that is "not real radio" but the path it takes is similar to ham operations – even though it is through an Android phone app and the "repeater" is a cell tower.

Pictures of the GARS group at Harbins Park are later on in this GARzette.

I spent a few days in North Carolina and went to visit the Ashville Radio Museum. I saw some of the equipment I remember from my dad's basement shack that I listened to before I got my first license (a Hallicrafters S-20R). They had a small spark generator that was operational and didn't set off any alarms (I heard GARS had an issue with a demo resulting in the GARS meeting location change). The person running it had lots



of information about the museum and also about the history of radios in the museum. In a back room, there were radios for sale they had duplicates of – all of their radios are donated to the museum.

I recently purchased a 440 amp to extend the range of my IC705. I was just able to reach the GARS 440 repeaters barefoot. The amp I got (from a China distributer) helps a lot even though it does not appear to put out the 50W advertised with 5W input. It does support DMR and has an SMA input jack and a SO-239 output jack. It is small and for $99, it was a worthy addition for my 440 repeater access. Do I recommend it for others (?); depends on what you want to do with it. I'd say it does ½ of what is advertised. It does appear to be well made. I may have got in on a good price – looking again at eBay and it is out of stock where I got it from and other are selling what looks like the same unit for at least 25% more. So much for not getting name brand equipment – but I do take chances and sometimes it does work out better than when I started.

Sandy Jackson KJ4DRO who served as GARS Health and Wellbeing has had to pull back to spend more time with her family. Sandy has been ideal in representing GARS when one of our members has had health or other issues affecting them. She has been our "face" to help our members thru their hard times. Sandy is now helping her husband, and I wish back to her all of the help she has given other members of GARS. Sandy was also the lead popcorn maker at the Stone Mountain Hamfest and that was another part Sandy provided for GARS.

Sandy is not leaving GARS but is just stepping back from all of the things she did for us and we wish her the best.

Bob – K4CQO
Club President / GARzette Editor

GARS Repeaters and Other Communications

2 Meter Repeaters	6 Meter Repeater	
147.075(+) MHz Tone 82.5 147.255(+) MHz Tone 107.2 1.25 Meter Repeater 224.580(-) MHz Tone 100.0, 1.6 MHz Offset 70 Cm Repeaters 444.525(+) MHz Tone 82.5 442.100(+) MHz Tone 100 442.325(+) MHz Tone 100	53.110 (-1 MHz) No Tone **Other Resources:** APRS 144.390 -- 1200 Baud W4GR	6M Operational in Buford 147.075 Operational in Snellville 147.255 Operational in Snellville 224.580 Operational in Grayson 442.100 Operational at Goshen Springs Rd, Norcross 442.325 Operational in Buford 444.525 Operational in Snellville Link remote receivers being added

Notable Web Links

Ham Radio Glossary: https://noji.com/hamradio/glossary.php a very comprehensive listing provided by Noji Ratzlaff KNØJI. On his site there is also a lot of information about getting started in ham radio.

Need Help – Let GARS Elmers answer your questions

Send an email to elmers@gars.org with the subject listing the area (like Antennas, Repeaters, Digital, DMR etc.) of your query to get to GARS Elmer volunteers.

About the GARzette

The *GARzette* is the official monthly newsletter of the Gwinnett Amateur Radio Society, serving its members and other persons interested in the advancement of the Amateur Radio art.

Original articles, art, and photos are invited and encouraged. Previously copyrighted submissions cannot be accepted for reprinting unless permission from the appropriate publisher is provided in writing along with the information being submitted. If reprints are from publications allowing their unrestricted use, please include a copy of the printed permission contained in the publication.

If possible, bring your articles to the monthly meeting in Microsoft Word or rich text (.rtf) or text or HTML format or by e-mail to editor@gars.org. Artwork can be accepted in most any graphics format and can be submitted via e-mail to the same address. Alternate means of submittal can be arranged when necessary.

In keeping with the Amateur Radio spirit, permission is hereby granted for the reproduction of The *GARzette* articles by other Amateur Radio club newsletters provided that proper credit is given to the individual author and *The GARzette*.

The GARzette is published each month with the assistance of Karen KI4HPP and Kyle W4KDA who print copies for distribution, etc., Dave Bruse, W4DTR, who distributes the newsletter electronically, and Mark Prichard KN2TOD who delivers the GARZette to our local HRO store.

Deadline for submissions is the 28th of each month for inclusion in the following month's issue.
For additional information view our Website at: http://www.gars.org [PS— Articles to publish in the GARzette, either written by GARS members or published elsewhere, are always welcome. —Ed.]
Newsletter Email: editor@gars.org Editor: Bob Hoffmann, K4CQO

GARS Upcoming Meetings & Workshops

GARS Meetings and Workshops are held in-person at the EAA 690 Hangar, 690 Airport Rd, Lawrenceville, GA 30046.

Meetings and Workshops are OPEN to all, feel free to share your invite with others.

When GARS meetings are available, they can be found on YouTubeLive each month on the second Tuesday at 7:00 PM Eastern (information also available on http://www.gars.org). Members are able to attend the GARS Executive Meeting (via Microsoft Teams) on the 1st Tuesday of the month – send an email to the GARS President (president@gars.org) for information to attend.

GARS Meetings Schedule (second Tuesday @ 7:00 PM): (these are the presentations)

- July 14th – Meshtastic by Ed Labra
- August 11th – MeshCorp by Mark Bell
- September 8th – CubeSat Presentation by Annie Mehta KQ4NJC

Workshop Schedule (third Tuesday @ 7:00 PM): (these are the Hands-on Workshops)

- July 21st – Meshtastic by Ed Labra
- August 18th – MeshCorp by Mark Bell
- September 15th – CubeSat Presentation by Annie Mehta KQ4NJC

GARS Meeting – July 14, 2026
Meshtastic by Ed Labra

You've probably seen the massive explosion of those tiny, $30 LoRa radio boards popping up everywhere. Is it just a toy for unlicensed users, or is it a legitimate asset for Amateur Radio operators?

Ed will be diving headfirst into Meshtastic from a Ham's Perspective.

While hams excel at long-distance voice and HF, Meshtastic brings distinct advantages to the table: automatic multi-hop packet routing, dead-simple GPS location sharing, and instant smartphone integration—all running on less than half a watt.

GARS Workshop – July 21, 2026
Meshtastic

Ed will be at the Workshop to help all setup their Meshtastic nodes.

GARS workshops provide further information about the presentation given the week before on a one-on-one basis with the various presenters and there are also Elmers present on a variety of subjects to help with any questions you may have about ham radio – including help you're your equipment that you can bring in.

Elmers are always present at the GARS Workshops. Feel free to bring your questions to the Workshop. If your project is small enough to bring to the meeting, let us know in advance so we can bring tools, test gear, etc.

GARS would like to thank Harold KI4FPR and Pam KJ4RYV for providing the ice cream we all enjoyed at our outing at Harbins Park.

GARS Happenings

20 Years ago in the GARS, ham radio, newsletter, Gwinnett 2006 July GARzette:

The GARZETTE

- Norm Schklar WA4ZXV provided his Field Day activity history
- This was a “cheer USA” GARzette providing a non-political look at the flag and the Star Spangle Banner
- There was a Kim Komando article about Firefox – always interest in hints for hams

You can always browse the GARzette archive at http://www.gars.org/newsletters. 73, Bob, K4CQO, GARzette Editor

Look for this resource on Email (https://gars.org/contact/) and use it as a means to convey information about a GARS family member or Silent Key notification.

Net Managers Corner

Monday Night 2 Meter “Want, Swap, Sell, and Information Net”
Thursday Night 440 Buford Repeater Net

GARS NEEDS MEMBERS
TO SERVE AS NET CONTROL STATIONS!

GARS is a great Amateur Radio service club with the membership and awards to prove it. Our club is very busy and active, and we use the Monday night net to get timely information out to our members. Weekly participation is needed to make our net function well. There is only a small group of very dedicated people who make the net happen each week, and we need more members to volunteer to serve as Net Control Stations (NCS) on a rotating basis.

Out of almost 300 members, there are six operators who serve as the NCS for the GARS net every Monday night. GARS can always use more volunteers In no particular order, they are:

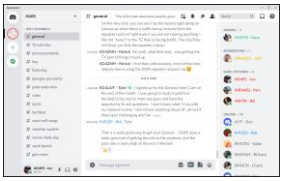
Ray – N4GYN David – KA4KKF Don – KM4BWT Joe – KR4LQL Chuck – KK4TKJ Ed – W4BSR

To volunteer to help as a NCS for the 440 Net contact Jim O’Brien KQ4RNA.

As GARS Net Manager (Chuck KK4TKJ), I would like to have more volunteers to fill NCS positions. I do plan and post the schedule months in advance. Any conditions will be accommodated that you as a rotating NCS need to place on the scheduling of your duties. If your plans change, I can make adjustments for the schedule to work, and I will make those changes happen as soon as I am notified of a problem. As Net Manager, I also send out reminders each week to let the NCS scheduled know he or she is NCS for the next Monday night net. In short, serving as a rotating NCS is a small duty but a great contribution to the club. The “Want, Swap, Sell Information Net” begins promptly at 19:30 every Monday night and runs about 30 minutes. As a scheduled NCS, you will request the assistance of a volunteer alternate NCS each time you have Net Control. Your simple duties will be to tune in to the GARS repeater, read the script, take a few notes and forward the information to me for record keeping.

Please lend a hand and contact (Chuck) via Email (Click Here to Email our Net Manager) to help support the effort that makes GARS the great club that it is. See you on the Nets!

Don’t forget about our Discord utility for GARS announcements, news, activity spotting and more. See http://www.gars.org top of the home page. This is a sample of Discord. →

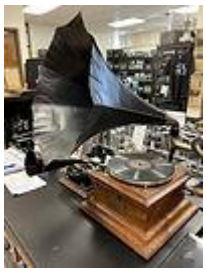


Ashville Radio Museum

By Bob Hoffmann K4CQO

In case you are in the Ashville, NC area, there is a Radio Museum (Asheville Radio Museum | Asheville NC) there you can visit and experience some of the history and look at some of the early radios, including ham radio equipment.

It opened in 2001, started by a small group of hams, one of whom was an instructor at Asheville - Buncombe Technical College ("A-B Tech"). He asked if a small empty store room could be used to start a radio museum. He was given the OK, with the proviso "we'll see how it goes after a year." It apparently did well enough; the museum celebrates its 25th anniversary this year.



Most of the pieces originally on display were ham gear, as this was the focus of the founders. With new volunteers joining as the founders became silent keys, interest developed in expanding the broadcast radio side of the museum. Many such radios have been added over the past decade, the most prized of which is a Zenith Stratosphere model 1000Z. Because it sold for more than the cost of a new car in 1935-36 (i. e., just after the Depression), only around 350 were sold, and only around 50 are known to exist today. Ours is one of two I know to be on display in a U. S. museum.

We continue to receive donations, mostly from families where the radio guy has passed on. At this point, there are very few "have to have" radios out there and the museum is very full. So, we keep some donated pieces that upgrade or expand our collection, and sell the rest at hamfests or our annual Vintage Mart (September 26 this year). The funds are used to sustain our operations and fill holes in our collection. Note: We are an all volunteer operation; volunteers do not receive any compensation; we do not charge admission.

We pride ourselves on being a teaching museum. Most of our visitors are not hams, but rather have a general interest in radios or radio history or just like visiting small specialty museums where they receive tours by knowledgeable docents. We try our best to amaze, fascinate and educate and are proud of having over one hundred five star reviews... none less than five stars.

Several of our volunteers are highly experienced in restoration work. We now have many radios that are capable of being demonstrated (when I joined around nine years ago there was nary a one!).

As to our future direction... We will always maintain a strong focus on ham and broadcast radio, yet are adding small exhibits of other items to broaden our appeal and attract more visitors. So, there are now antique phonographs, antique TV, antique home movie cameras and projectors and even some early personal computers by HealthKit and Apple. Our latest addition is a modern Tesla Coil, which we use to light a fluorescent tube while explaining the important contributions of Nikola Tesla.

GARS Field Day 2026 - One for the log books

Again, we operated 8 Alpha from Harbins Park. We had 50 or so club members attend at some point over the weekend. Don KM4BWT made sure we were fed well, plenty of BBQ pork, chicken, and all the fixings. Glen W3WWT counted 42 people at the BBQ dinner on Saturday.

GARS Field Day is like watching a well-oiled machine. So many things going on at once. Trailers arriving on site and being unloaded, tables being moved into place, coax cables being pulled, antennas going up, generators being set up, networking cables being pulled, stations being set up, tables being prepared for food. Small teams converge, seeing what needs to be done and doing it. Then, moving on to the next project.

Station Captains and bands: Rick N4XYY - 80m/10m Digital, David KA4KKF - 40m Digital, Deon KR4CUN - 20m Digital, Paul W4KLY - 80m/20m CW, Drew KQ4NUQ 40m SSB, ARES Trailer 20m SSB, Glen W3WWT 15m SSB, Mario KR4CUK 75m/10 SSB, and while we didn't have a GOTA station William KR4EAY was ready to coach anybody willing to Get On The Air.

Other volunteers and I know I'm going to miss a few: Kevin W4KIB was our Antenna Captain, Larry KE4ESV was our Safety Officer, Generator and Power Eddie K4AIH, David KA4KKF brought Saturday Breakfast and copied the ARRL Bulletin message, Don KM4BWT brought Saturday Lunch/Dinner, and Sunday Lunch, Edwin W4BSR ran Audio/Visual, Pam Brown KJ4RYV Ice Cream Saturday night, Kevin K4GTR provided Solar Power and was our Network Captain, Alan K5AKG set up the Public Info Table, Harold KI4FPR brought the GARS Trailer and Hal W4IGE brought the Gwinnett ARES trailer and sent the SM/SEC message, plus many others.

Our On-Air Stats - Total Contacts by Band and Mode

Band	CW	Phone	Dig	Total	%
80	0	2	105	107	7%
40	74	498	287	859	58%
20	138	169	10	317	21%
15	0	86	49	135	9%
10	0	30	33	63	4%
6	0	0	3	3	0%
Total	212	785	487	1484	100%

We contacted every state except Nevada and all but two Canadian provinces. 40 meters was our money band, 58% of our contacts were on 40 meters.

Our claimed Bonus Points:

Bonus Points	Volunteer		Claimed
100% Emergency Power:	ARES	100 points per transmitter	800
Media Publicity	Kevin K4GTR	100 bonus points	100
Public Location	Harbins Park	100 bonus points	100
Public Information Table	Alan K5AKG	100 bonus points	100
Message to Section Manager	ARES	100 bonus points	100
W1AW Bulletin	David KA5KKF	100 bonus points	100

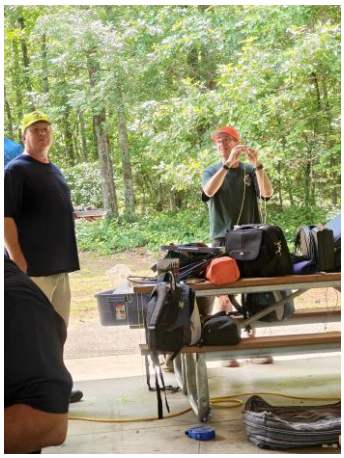
Bonus Points	Volunteer		Claimed
Web submission	Dallas N4DDM	100 bonus points	100
Youth Participation	Emma	18 years and under, 20 points per contact, 100 points max per youth	20
Safety Officer	Larry KE4ESV	100 bonus points	100
		Claimed Bonus Points	1,520

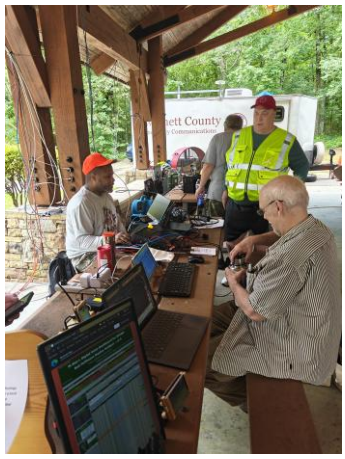
Listed are our 15 top contact-making operators: Maggie made 303 QSOs.

Operator	Total	%
Maggie KM4PTW	303	20
David KA4KKF	261	18
Paul W4KLY	186	13
Drew KQ4NUQ	122	8
Rick N4XYY	97	7
Mary KR4JIJ	71	5
Joe AD4PZ	47	3
Randy KN4DY	46	3
William KR4EAY	38	3
Jeff AB4HF	31	2
Glen W3WWT	29	2
Andre W7ALS	27	2
Mario KR4CUK	26	2
Mike ND4V	26	2
Eddie K4AIH	24	2

73 Dallas N4DDM
GARS Field Day Chairman 2026

GARS Field Day Pictures





Dave's Computer Tips – Why GARS Uses Discord

By Dave Bruse, W4DTR (with a little help from ChatGPT)

Many of our members are familiar with email, but fewer have had a chance to explore Discord. If you've heard the name but aren't sure what it is, you're not alone.

Discord is a free online communication platform that allows people to connect through text messages, voice calls, and video chats in organized communities called "servers." Originally popular with gamers, Discord has evolved into a powerful communication tool used by clubs, nonprofits, businesses, schools, and hobby groups around the world. It works on computers, tablets, and smartphones, making it easy to stay connected wherever you are.

Why GARS Uses Discord

For the Gwinnett Amateur Radio Society, Discord provides a convenient way for members to stay connected between meetings, events, and on-the-air activities. Unlike email, Discord allows real-time conversations, making it easy to ask technical questions, share photos, coordinate activities, and receive quick answers from fellow members.

Whether you're troubleshooting an antenna issue, discussing the latest radio equipment, arranging a POTA activation, or simply chatting with other hams, Discord gives members a place to interact throughout the week. It complements our existing communication tools and helps keep the GARS community active and engaged every day.

How Discord Compares to Other GARS Communication Tools

GARS uses several different communication platforms, each serving a unique purpose.

Groups.io

Groups.io remains our primary email reflector. It is ideal for official announcements, club discussions, meeting notices, and information that members may want to archive and reference later. Messages arrive directly in your email inbox and can be read at your convenience.

Discord differs in that conversations happen in real time. Think of Groups.io as a mailing list and Discord as an ongoing club conversation that members can join whenever they have time.

Facebook

Facebook is useful for promoting club activities to the public, sharing photos from events, and helping prospective members discover GARS. However, many members either do not use Facebook or visit it infrequently.

Discord provides a dedicated club space without the distractions of a social media news feed and offers more organized discussions focused specifically on amateur radio and club activities.

YouTube

YouTube serves as a repository for videos, presentations, demonstrations, and educational content. It is an excellent platform for watching and learning, but it is not designed for ongoing conversations.

Discord complements YouTube by giving members a place to discuss videos, ask questions, and continue the conversation after viewing club content.

X (formerly Twitter)

X is useful for quick public updates, event reminders, and reaching a broader audience. However, posts are generally short-lived and not well suited for in-depth discussions.

Discord provides dedicated channels where conversations can continue over time and where information remains organized by topic.

Better Together

No single platform does everything well. Groups.io, Discord, Facebook, YouTube, and X each serve different purposes. Together, they help GARS communicate effectively with members, share knowledge, promote amateur radio, and build a stronger community.

Getting Started with Discord

Joining the GARS Discord server is easy. Simply visit GARS.org and click the **"Discord"** link located near the top-right corner of the home page. If you do not already have a Discord account, you will be guided through the free account creation process.

After joining the GARS Discord server, you will initially have access only to the **#waiting-room** channel. This helps us prevent spam and ensure that only legitimate users gain access to the server. Please read and follow the instructions provided in the **#waiting-room** channel. Once your access request has been reviewed and approved, you will be admitted to the rest of the server and can begin participating in discussions, asking questions, sharing photos, and connecting with fellow GARS members between meetings and events.

General HamCram July 25 and 26

WHEN: Saturday 7/25/26 and Sunday 7/26/26; 8:00am to 4:00pm each day, exams start at 4:00pm Sunday (this is a CLOSED exam session, only open to registered students of the class).

WHERE: EAA 690 Hangar, Gwinnett County Airport – Briscoe Field, 690 Airport Rd, Lawrenceville, GA 30046

MORE INFO: To register for our 2-day HamCram Class, use our registration form below. Pre-registration is REQUIRED. No Walk-ins accepted. This fee is non-refundable. Our $25 fee covers the class and lunch both days, and the exam fee for the exam given Sunday at 4:00pm. Lunch will be brought in to save time.

We will be using the Ham Radio School General License Study Guide for this class. You can purchase the study guide locally at Ham Radio Outlet in Doraville, or purchase the book online at HamRadioSchool.com. We encourage you to at least look over the material in a study book and take some practice tests. We will go over every question in the question pool during the class, but remember that the test will only be 35 multiple choice questions. If you get 26 out of the 35 questions correct, you will pass the test. We suggest that you take some practice tests prior to the class to familiarize yourself with the question format and some of the material. Go to our exam page for sample online tests towards the bottom.

QUESTIONS: Questions about the class or the exam session — **click here** to email the instructors.

REGISTRATION:

***** Pre-registration is Required *****
***** There is a no refund policy for no shows *****

https://gars.org

The Basics by Bob Schmid, WA9FBO

The Fluid Theories

de: Bob Schmid, WA9FBO

For a while, early electrical researchers thought that electricity was a fluid. Why?

The two-fluid theory

In 1733, French chemist Charles du Fay wrote that he had discovered two distinct types of electricity: *vitreous electricity*, produced by rubbing glass with silk, and *resinous electricity*, produced by rubbing resin or amber with wool. He believed that these two forms of electricity were invisible fluids.

His theory gained support with researchers. Hydraulics and pneumatics were well understood; fluid models were used to explain heat and magnetism. It followed that electrical charge could flow from one object to another like a liquid moving between containers. Charged objects attracted or repelled each other, just as pressure in a fluid pushed or pulled objects. Conductors acted as pipes, allowing fluid transfer, while insulators contained the fluids.

The one-fluid theory

In the 1740s Ben Franklin experimented with Leyden jars – glass jars with metal foil on the inside and outside surfaces (Fig. 1).

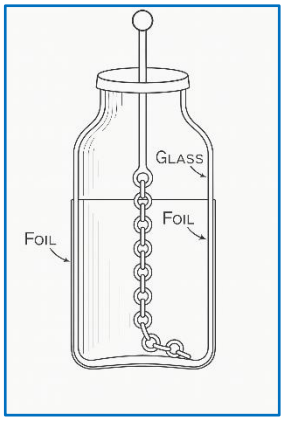


FIGURE 1 - LEYDEN JAR

A Leyden jar could be charged, increasing its electric fluid, and discharged, releasing it. These devices came to be known as "condensers" because they appeared to condense (accumulate) electric fluid into a small volume.

Franklin noticed that when he connected a charged Leyden jar to an uncharged one, the total amount of electricity remained the same. Further, the inner and outer surfaces of the Leyden jar could hold opposite charges. Around 1747 he concluded that electricity was not two separate fluids but one. He believed one surface of the Leyden jar had a "positive" charge from an excess of fluid. It could be transferred to the other surface, which had a "negative" charge from a deficiency of the fluid. When the jar was discharged, the fluid would move back to restore balance.

Franklin's famous kite experiment in 1752 reinforced his view. He thought that clouds became electrically charged through friction, and the electrical fluid in the atmosphere caused lightning as it balanced itself by moving between clouds or from clouds to ground.

The particle theory

The fluid theories began to unravel when Alessandro Volta invented the chemical battery in 1800. It generated current continuously and showed that electricity wasn't just a fluid that accumulated and discharged, but rather something that flowed in a circuit.

Fluid theory held that electrical fluid moved through materials without any connection to magnetism. But in 1820 Hans Christian Ørsted linked electricity with magnetism when he showed that a current-carrying wire influenced a nearby compass needle.

By the mid-19th century, scientists began to understand that electrical current was related to the movement of negatively charged particles. The discovery of the electron by J.J. Thomson in 1897 confirmed it.

Fluid theory still resonates

We may smile at the beliefs of the early researchers, but certain ideas from the fluid theories—such as "positive" and "negative"—still remain with us today. Other examples include:

• The "**condenser**" is now called a "**capacitor**", but we still picture it as storing charge—like water in a tank. Mechanics still speak of replacing the "points and condenser" in vintage cars (Fig. 2).

FIGURE 2 - "CONDENSER"

• Electrical “**current**” refers to the movement of electrons through a conductor over time, much like a quantity of fluid moving through a pipe.

• We think of “**voltage**” as pressure: it drives current through a conductor just as fluid pressure drives liquid through a pipe.

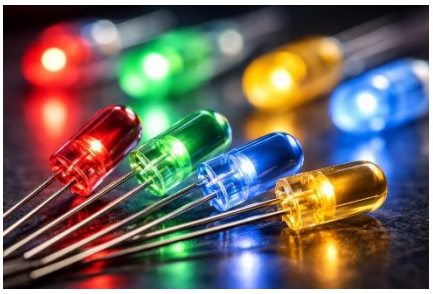
• Electrical “**resistance**” slows or opposes current in the same way that friction or obstacles impede the flow of water in a pipe.

• The term “**ground**” arose from the belief that the Earth was a vast reservoir for electrical fluid. Today we ground electrical systems to provide a common reference point, not a sink for fluid.

LEDs

In 1907 British scientist Henry Round of Marconi Labs, while experimenting with cat’s-whisker detectors, applied a voltage to a silicon carbide (SiC) crystal and saw a faint yellowish-green glow where the metal whisker contacted the crystal. In the 1920s Russian scientist Oleg Losev observed that SiC crystals emitted light when forward-biased and theorized it was caused by recombination of electrons and holes in the material.

These discoveries remained curiosities because the physics behind semiconductors was not well understood, high-purity materials were not available, the light was dim, and incandescent and gas-discharge lamps were dominant. The practical LED had to wait until the 1960s, when advances in semiconductor materials, doping techniques, and crystal growth made it possible to produce bright, efficient light sources.



Red LEDs

In 1962 Nick Holonyak Jr. developed the first visible-spectrum LED bright enough for practical use by using gallium arsenide phosphide (GaAsP). It emitted red light, a breakthrough because previous LEDs were infrared and mainly used for sensing. Early red LEDs were usable but not especially bright, and were mostly limited to calculator displays, clocks, watches, and instrument panels.

Green and yellow LEDs

In the late 1960s, improvements in semiconductor materials led to the development of green and yellow LEDs, but the brightness was still low due to indirect bandgap materials.

In 1972, electrical engineer M. George Craford used GaAsP but increased the phosphorus-to-arsenic ratio. This pushed emission from red toward orange and yellow and improved efficiency. Craford also developed a red LED that was roughly 10 times brighter than Holonyak's.

Efficiency breakthroughs

In the 1970s researchers developed more efficient LEDs using new materials like gallium aluminum arsenide (GaAlAs), making LEDs bright enough for practical use in displays and signage.

In the 1980s infrared LEDs became widely used in remote controls, and simple LED displays, including 7-segment numeric displays, became more common.

Blue LEDs

By the 1990s, red and green LEDs had been around for decades but blue LEDs were elusive because the right semiconductor material was difficult to find. In 1994 Japanese engineer Shuji Nakamura of Nichia Corporation developed a high-brightness blue LED using gallium nitride (GaN). It was a game changer.

White LEDs

Why was blue so important? To generate white light from LEDs, you can either combine red, green, and blue (RGB) LEDs, or use a blue LED with a phosphor coating that converts part of the blue light into longer wavelengths, which then mix to appear white (this is how most white LEDs work today).

Before blue LEDs, there was no practical way to produce white light using LEDs. Nakamura's work led to major advances in lighting, displays, and energy efficiency. For this breakthrough, Nakamura, along with Isamu Akasaki and Hiroshi Amano, was awarded the 2014 Nobel Prize in Physics for their work on blue LEDs. In 1996, the first practical white LED was demonstrated using this phosphor-converted approach, typically with yttrium aluminum garnet (YAG), and the method remains widely used today.

Modern LEDs

In the 2000s advances in efficiency and cost reductions allowed LEDs to replace incandescent and fluorescent bulbs in general lighting.

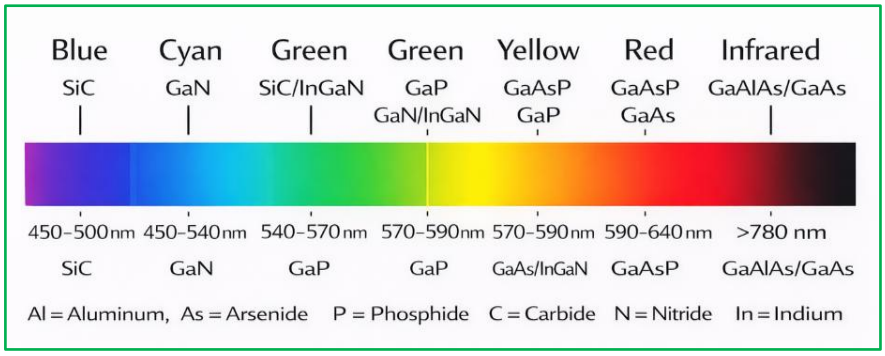
In the 2010s LED backlights became standard in TVs, and LEDs revolutionized automobile headlights.

And in the 2020s, cutting-edge technologies like MicroLEDs and quantum dots are being developed for ultra-efficient, high-resolution displays. Researchers have demonstrated LEDs whose emission wavelength can be tuned across multiple primary colors from a single device. This approach could reduce the need for separate red, green, and blue emitters in future high-resolution micro-LED displays, though it remains an active area of research rather than a fully commercialized technology.

How LED Color Works

An LED's color is set by the semiconductor material, not by voltage or current.

When an LED conducts, electrons fall across an energy gap called the bandgap. The size of that gap determines the wavelength of light that's emitted. Large bandgaps produce blue light; smaller bandgaps produce red or infrared.



Some LED materials are alloys, such as gallium arsenide phosphide (GaAsP). By changing the mix of elements in the crystal, engineers can tune the bandgap and shift the color from red toward orange or yellow.

That's why the chart links each color to a specific chemistry—and why some colors took decades longer to achieve than others.

Because of this, some materials appear in more than one color range on the chart. This doesn't mean they work equally well at every wavelength shown. In many cases, a material can emit light in a given color only weakly or inefficiently, while another material emits strongly at the same wavelength. The chart shows where light can be produced, not how bright or practical an LED will be.

Drake Makes a Last Stand

Vintage Amateur Radio

de Bill Shadid, W9MXQ

By the early 1980's R. L. Drake was feeling the competition from Japan for Amateur Radio Equipment. Hallicrafters, Hammarlund, and National had left the scene, either gone out of business (National and Hammarlund) or morphed into military suppliers (Hallicrafters). Collins, that is with us to this day, had recently released their last amateur radio product, the KWM-380 HF Transceiver. Major producer, Swan, had taken the name of its corporate owner, Cubic, and produced transceivers along with Drake, into the mid-1980's. A spinoff headed by Swan's original founder, Herb Johnson, W6QKI, had started Atlas Radio Company, in 1974, making transceivers, transmitters, and receivers but was fading from the market in the 1980's. (They did attempt a comeback in the early 1990's – but it was not successful.[1])

Those of you that read my articles regularly know that I am a dyed in the wool fan of the R. L. Drake Company and their amateur radio products. Outside of ham radio and shortwave listeners, they are more well known for their line of data and video downlink receivers and related electronics supporting the satellite communications industry.

So, back to the 1980's where we will be for this installment, talking about this complete Drake TR5 Station from that time (supported by a few modern accessories):

Front and Center – Drake L75 Linear Amplifier, Drake TR5 HF Transceiver, Drake RV75 Digital Remote VFO with other Accessories.

W9MXQ Photo

The other accessories in the above picture include the Drake SP75 Speech Processor and CW75 Electronic Keyer positioned on top of the TR5 Transceiver. At the left side of the picture, see the Drake WH7 Wattmeter sitting on top of the Drake MS7 Speaker Console. On top of the L75 Linear Amplifier you will see a slightly more modern accessory, the Timewave DSP-59+ External DSP Unit. Out front you can see the Drake 7077 Desk Microphone. Also shown are much more current accessories, including Unified Microsystems XT-4 Memory Keyer, the Bencher BY-1B Paddle, and a Nye Viking Straight Key.

In 1981, following their successful TR7 and TR7A HF Transceivers and accessories, Drake was introducing a cost reduced, and in some ways better performing TR5 Transceiver. Gone was the complex (and expensive) up-conversion design, replaced by a more traditional and conventional design – based on the very successful and long running Drake TR-4CW/RIT Transceiver – the last TR-4 model. Actually, block diagram comparisons of the TR-4 design and the TR5 design shows similarities indicating that the TR5 was perhaps a solid-state version of the old TR-4.

Never Produced - Drake TR-5

Three years ago, this author wrote about the Drake TR5 Transceiver and broached the subject of the never produced TR-5 Transceiver of hybrid design (solid state with vacuum tube driver and final amplifier). Readers will recall my comparison of the TR-5 and the ultimately produced TR5. (Drake dropped the hyphens, at the beginning of the TR7 product lineup.)

Moving into the 1980's, Drake was evolving both the Transceivers and the Accessories in their line. It appears that Drake was continuing to field the TR7 Transceiver design (and the later TR7A, which included many optional features original TR7 product offering).

> Note: A model TR7B was prototyped that included design opportunities to reduce cost and improved dependability in areas like the digital readout, and elsewhere. Likely, a TR7B variant would also have made the WARC bands easier to access than they were on the TR7 where an optional circuit board, the AUX7, was required.

Drake was evolving its accessory line to become more compatible with both the TR7 (and TR7A) line and the new TR5 product as well. This is evidenced in model designations that evolved away from being things like an MN7 Antenna Tuner evolving into an MN75 Antenna Tuner. Note that the newer tuner (more outwardly embracing the newly assigned WARC Bands) uses the number "75," which enhances its use with both the TR7 and the TR5 radios.

The 200 to 300-watt antenna tuners from Drake had evolved with repackaged, specification adjusted products. These products are shown in different forms over the years: (4-Series Antenna Tuners are shown because they remained very popular.)

Drake MN-4 Antenna Tuner

Drake MN7 Antenna Tuner

Drake MN75 Antenna Tuner

R. L. Drake Company

The 300-watt Drake MN-4 Antenna Tuner matched the Drake TR-4 Transceiver Series and the T-4X Transmitter Series radios. Essentially the same, different adaptations to supported frequency bands the following specifications were supported:

Medium Power – 300-Watt (Input Power) Antenna Tuners			
Models	**Bands**	**WARC Bands**	**Matching Radios**
MN-4	80-10 Meters	No	TR-4(x) & T-4X(x)
MN-4C[3]	160-10 Meters	No[4]	TR-4(x) & T-4X(x)
MN7	160-10 Meters	No[4]	TR7
MN75	160-10 Meters	Yes	TR5 and TR7

Interestingly, Drake used a different numbering approach in the high power (2,000 watt) tuners. These included the MN-2000 for the TR-4 and T-4X series transceivers and transmitters (and L-4B Linear Amplifier) and the MN2700 for the TR7 and later the TR5 Transceivers. Later, the MN2700 was also matched with the Drake L75 Linear Amplifier.

High Power – 2000-Watt (Input Power) Antenna Tuners			
Models	**Bands**	**WARC Bands**	**Matching Radios**
MN-2000	80-10 Meters	No[4]	TR-4(x) & T-4X(x)
MN2700	160-10 Meters	No[4]	TR7

In the case of the high-power tuners, note that Drake merely changed the popular MN-2000 to a number referencing the old product but inserting the “7” in the number to denote the new product line and specifically the TR7 Transceiver and L7 Linear Amplifier.

High Power – 2000-Watt Antenna Tuners

Drake MN-2000 Antenna Tuner

Drake MN2700 Antenna Tuner

W9MXQ Photos

Drake Antenna Tuners were not wide range as far as impedance matching capability. The MN-2000 unit – used by many to this day even in later Drake products – had a capability of matching 3:1 SWR to unity. The MN2700 improved on that figure with the capability of matching 5:1 SWR to unity. And, to go a step further, the MN2700 had an optional, rear mounted 4:1 balun allowing matching up to 5:1 for balanced feed-line antennas. I have successfully used my MN2700 to load end-fed wire antennas – something not always practical with the MN-2000.

Drake also made a variety of Remote VFO products to support the TR7 and TR5 Transceivers. Three of them were announced and two were produced.

	The Drake RV7 VFO This is the original Remote VFO introduced in 1977 at the time the TR7 Transceiver came to market. It works fine with the TR5 Transceiver but the dial is backward to what is required in that radio. (That does not cause a problem as long as the user monitors the radio's readout.) **W9MXQ Photo**
	The Drake RV5 VFO This VFO was designed for the TR5 and is identical to the RV7 except that the analog calibration is backward to the "7" model. This model was never produced. It was only made as a prototype. **WB4HFN**
	The Drake RV75 VFO This digital, programmable, VFO was actually introduced as an accessory for the TR5 but caught on for the TR7 as well. It is very stable, compared to the RV7. It can be programmed for fixed frequency operation. **W9MXQ Photo**

The TR5 did not have an analog VFO readout on the front panel as did the TR7. Actually, the digital readout on the TR7 was an option, at first. The analog dial worked just like the one on the Drake TR-

4C(and later) Transceiver, the R-4C Receiver, and the T-4XC Transmitter. However, very few TR7's where ever shipped without a digital readout.[5]

> Note: All along here I have referenced the "VFO" in the various radios and accessories. To be clear, Drake did not use the traditional VFO we have come to see as being tuned with a variable capacitor. Drake used a Permeably Tuned Oscillator, known as a "PTO." No matter how we identify it, it is still a "variable frequency oscillator." So, using the more common "VFO" designation is technically correct, if not common.

A major accessory in any amateur radio product line has to be a Linear Amplifier. Second only in cost to the Receiver/Transmitter or Transceiver in the setup. Drake was no exception. Drake started with the popular L-4 and later the L-4B, 2,000-watt PEP SSB and 1,000-watt CW/RTTY Linear Amplifiers. With the release of the TR7, and later with the release of the TR5, Drake had two newer amplifiers, the Drake L7 and the Drake L75, respectively.

Drake L7 and L75 Linear Amplifiers – Power and Specifications		
Detail	**Model L7**	**Model L75**
Vacuum Tubes	Eimac 3-500z (2 tubes)	Eimac 3-500z (1 tube)
Bands Covered	160-10 Meters (Broadband 1.8 to 30 MHz)	160-10 Meters (Broadband 1.8 to 30 MHz)
Power Input (SSB)	2,000 Watts	1,200 Watts
Power Input (CW)	1,000 Watts	1,000 Watts
Power Output (SSB)	1,200 Watts	600 Watts
Power Output (CW)	600 Watts	600 Watts
AC Power Input	120/240 VAC	120/240 VAC
Power Supply	Separate Cabinet	Internal

Front Panel Layout – L7 at the Left – L75 at the Right

The L7 has a Power Supply that sits elsewhere. The L75, on the other hand, is a self-contained, single cabinet radio. Both operate with about 3,200 Volts.
The internal design of the two is very similar in many ways.

Both are W9MXQ Photos

At the time these amplifiers were produced, the legal power level for amateur radio operators was 1,000 watts DC Power Input (simply stated). Also in that period, the Federal Communications Commission in the United States, had agreed that we could run 2,000 watts input power on SSB. Using linear amplifier technology of the day, it meant running an average input power of 1,000 watts. This is a subject for another day but in today's world in the United States, running these amplifiers loaded to 2,000 watts (for 1,000 watts output) on CW is perfectly legal on the two-tube L7 Linear Amplifier. That amplifier is limited by the capability of the 3-500z finals operating at the plate voltage and current provided by the power supply. The tubes are capable of more power than the amplifier can actually accommodate.

The complete station shown on the first page of this article was setup to demonstrate this vintage of equipment operating on SSB and CW. Modern modes, such as FT8, for instance, are not possible but modes such as RTTY and PSK31 are certainly within these radios' capability.

Operating of the TR5 Transceiver with the L75 Linear Amplifier on CW is a real pleasure. Here are some meter pictures at key down drive power of about 70-watts from the TR5:

TR5 running 70-watts showing 2,800 DC Volts on the plate of the 3-500z. Plate voltage at key up (no output power) is about 3,100 volts.

Further comment on plate voltage can be seen on the next page in the picture showing the station wattmeter.

W9MXQ Photo

TR5 running 70-watts showing 360 mA of plate current on the 3-500z.

360 mA at 2800 Volts = 1,008 watts. That is to Drake's specifications for this amplifier.

Plate current between CW characters (cutoff bias) is about 120 mA. That is to Drake's specifications for this amplifier.

W9MXQ Photo

This is the Drake WH7 Wattmeter showing 520 watts output. At 1,008 watts input this shows a plate efficiency of about 52%. That is acceptable for this amplifier operating in class AB1.

When running SSB, the capacitors in the power supply keep plate voltage more at about 3000 volts at the same 360 mA of plate current. That translates at voice peaks of close to 600 watts – an output some Drake literature would quote.

W9MXQ Photo

Some popular options at the time were the excellent Drake SB75 Speech Processor and CW75 Electronic Keyer. These, as shown on the first page of this article sitting on top of the TR5 Transceiver, are here:

Sitting on top of the TR5 Transceiver, left to right:
Drake SP75 Speech Processor and CW75 Electronic CW Keyer

W9MXQ Photo

The SP75 Speech Processor is setup to process audio from the Microphone, Tape Recorder, and Phone Patch (left to right on panel buttons, MIC, TAPE, and PATCH). The three input buttons are mechanically cancelling so pressing one, releases the other two. Separately there is a push-push power switch. The green lamp next to the ON button indicates power to the device. The AUDIO lamp to the left of the MIC button illuminates on voice peaks, according to the CLIPPING LEVEL-dB knob. I set my SP75 to 3 dB of clipping just to add a little “kick” to my voice. I am not after highly processed audio but this little device can push a lot of audio into the radio – up to the point of being very irritating to the listener. There is a somewhat involved alignment process when setting up the SP75 Speech Processor that is covered in the Operating Manual. This alignment is very sensitive to the microphone used and even between the several Drake 7077 Desk Microphones that I have. All require individual setup.

Properly adjusted and running a Clipping setting of 3 dB with the TR5 (or the TR7 and TR7A Transceivers) nets numerous audio compliments. Properly adjusted and used, the SP75 is a real asset to any Drake station. While the microphone connections are different, the SP75 works very well with the Drake C-Line Station (R-4C Receiver, T-4XC Transmitter) and the Drake TR-4CW/RIT Station. I have also used the SP75 very successfully with other brand radios, such as the Cubic Astro 103 Transceiver, the Swan 100MXA Transceiver, and the Hallicrafters SR-400 Cyclone II Transceiver. Again, keep the clipping setting to about 3 dB – resist moving it higher!!

One of the items that every collector of Drake solid state (TR5, TR7, and TR7A) transceivers looks for is the CW75 Electronic CW Keyer. Not many were made and a lot fewer ever become available today. They draw hundreds (and hundreds!!) of dollars when one solo unit appears on eBay or one of the sellers of vintage radio equipment. Look above at the CW75 at W9MXQ sitting to the right of the SP75. Here is the CW75 back panel, showing connections:

Rear Panel – Drake CW75 Electronic CW Keyer

W9MXQ Photo

This is a discrete TTL chip CW keyer – no dedicated keyer integrated circuit, such as the Curtis™ Keyer Chip (now owned by MFJ Enterprises). The CW75 is Iambic so modern in that way. No memories are available, but it does have the ability to key not only a solid-state radio but also has an optical coupler allowing it to work with more modern tube radios with grid block keying (+/- 300 volts at up to 100 mA). The reader has to remember that when the CW75 Keyer and the TR7 Transceiver were new, Drake was still making the Drake T-4XC Transmitter and the TR-4CW/RIT Transceiver. These were vacuum tube radios using grid block keying. So, Drake felt compelled to make the little CW75 backward compatible to grid block keyed radios in their lineup.

The 11-16 VDC IN line on pins 1 and 2 of the back panel strip could connect to 12 VDC that might be available in the shack – or to the 12 VDC accessory line on the back of the Drake PS75 Power Supply (for the TR5) or the Drake PS7 Power Supply (for the TR7 and TR7A). Note the polarity requirement on the key line (pins 3 and 4). One nice feature of the CW75 was the easy accommodation of a straight key (HAND KEY) on pin 5 (and pin 7 for ground, just to the right). (Pin 7 is also the ground connection for the Keyer Paddle on pins 6, 7, & 8.) This Key connection is handy on radios like the TR7 for quick key down if tuning a Linear Amplifier or Antenna Tuner. (The later TR5 has a front panel “Lock Key” position on the MODE switch to send a carrier for the same purpose – without a key.)

> Note: Times change and many hams today, not familiar with CW as a mode they use, have a key at their station simply to key their transmitter to get a carrier for the wattmeter, tune an amplifier, or tune an antenna tuner. Such keys are a nice visual touch but have never been used to send CW. Not a good or bad thing, necessarily, just reality!!

The CW75 Electronic CW Keyer is a fine piece of equipment but for this article and this setup, I did not use it. Of course, I did use the TR5 Transceiver (without the L75 Linear Amplifier most of the time) to operate CW, contacting Parks on The Air (POTA) stations. To run on CW, I used a very nice little CW Electronic Memory Keyer, the Unified Microsystems model XT-4. In the left picture, below, I had just finished setting it up and had the keyer power turned off, while listening to 40-meter CW:

CW Tools – Ready to go to work.

Unified Microsystems XT-4 Memory Keyer, Bencher BY-1B Key, and Nye Viking Speed-X Straight Key.

W9MXQ Photo

The Unified Microsystems after a string of CW contacts of POTA and Special Event Stations.

W9MXQ Photo

In the right picture, I moved the XT-4 so you can see it better. This was right after working a POTA station on 7026.9, running the 300 Hz filter in the TR5 – note the BW AUX rocker switch engaged on the TR5 – the switch to the left of the RIT control switch. The TR5 has one extra filter band position and in this one the filter is the Drake SL-300, 300 Hz unit. Running the RF Gain at about 1:00 and the AF Gain about 12:00 gives nice response with plenty of sensitivity in the radio coupled with very low background noise. “Riding the RF Gain,” as hams used to call it, is not very well known these days. In this series of CW QSO’s, I was running the TR5 barefoot (that is, without the L75 Linear Amplifier) at its full power of about 80-watts. (The TR5 is not as powerful as its big brother, the TR7.)

Just after finishing the above line, I had a fine QSO with a Mississippi ham on SSB. As I was checking some things on the setup (again, as you see on the first page of this article), I heard this fellow calling CQ with a strong signal. We had a nice, ten-minute QSO and gave each other “over S9” reports he complimented me on the sound coming from the TR5. I was running the L75 Linear Amplifier at the time at about 600 watts output. He was running a nice sounding Icom IC-7300 driving an old Heathkit SB-220 Linear Amplifier that his grandfather (now a SK) had built and used. “Nice to keep it in the family,” he said.

The last piece of this station setup is the Timewave DSP-59+. Along with a somewhat more advanced JPS NIR-12, these external Digital Signal Processing (DSP) units are often used in vintage station setups at W9MXQ. Some more recent technology is admittedly a good tool to help the old gear compete better when using it in today’s band conditions. These are audio-based DSP units – and as such are installed in the line between the radio and speaker in the station setup. Without getting too technical, their shortcoming is that they are outside the AGC loop in the receiver which can limit their effectiveness in some situations. This is not a major issue in the kind operating that I do with vintage equipment. Their biggest use for me is the automatically null out carriers, even multiple ones, and provide one of DSP’s finest features – Noise Reduction.

The Timewave DSP-59+ is sitting on top of the Drake L75 Linear Amplifier. See the station setup picture on the first page of this article.

W9MXQ Photo

While connected, the Timewave DSP-59+ was not used in this article. Band conditions did not call for more interference rejection than already provided by the TR5 Transceiver, alone. But, in addition to Noise Reduction (NR), the DSP-50+ can provide its own bandwidth filters at the audio level to reduce close-in QRM. Turning off the AGC in the TR5 removes the problem of AGC in the radio impacting performance of the DSP unit. Unlike many Transceivers in its price class, AGC in the radio could be set for Slow Attack, Medium Attack, Fast Attack, or Off. With AGC set to off, the DSP-59+ becomes a very effective Bandwidth, Low Pass, High Pass, and Noise Reduction unit assisting reception on the Transceiver.

All the above said, I want to add a closing note. Some of my articles showing operating stations are staged to show scenes similar to literature from the original manufacturer. One of my criticisms of manufacturer's literature is that they often show stacked accessories with the radios. This is evidenced in the picture on the first page, and elsewhere duplication Drake literature and magazine advertising from the time the radios were on the market. Personally, I never stack radios. The tendency is for the feet on the stacked radio to damage the cabinet surface of the radio sitting under it. If you must stack a radio, find a way to isolate two with thin paper. Better yet, don't do it!!

I appreciate that you read my articles. Remember that I am open to questions and comments anytime at my email address, W9MXQ@TWC.com.

A special note of thanks to my proofreader, Bob Bailey, W9DYQ. Bob is a lot more than a proofreader as he nearly always adds commentary that makes it into the article.

Credits and Comments:

[1] Herbert G. (Herb) Johnson, W6QKI, and Atlas Radio Company are good subjects for future articles.

[2] Drake of today is a part of Blonder Tongue™ at: https://www.blondertongue.com.

[3] The MN-4C was actually an MN7 that was painted and included a front panel to match the Drake R-4C, T-4XC, and TR-4CW/RIT equipment that was still in production and in stock at dealers. They supported a large established customer base.

[4] While these tuners did not cover, specifically, the WARC Bands, setting them to the closest band possible, made them fairly effective.

[5] A model TR7, initially did not have the optional DR7 Digital Readout included with the radio. Radios with the digital readout were known as a TR7/DR7 when first introduced. The option quickly disappeared and all TR7's soon came out of the factory with digital readout. The analog readout did not appear at all on the TR5 Transceiver.

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GARS Open Positions – Help Wanted

These are some of the positions that are available. If you have a background in any of these positions or want to learn them, they are available for you to fill.

- Health and Wellbeing
- Marketing Chair
- Activities Chair – includes the following types of activities that can be sponsored by GARS

1. Fox Hunt
2. GARS Operating Contests
3. Winter Field Day
4. GARS Hamfest Volunteers

- Non-Chair Activities needed:

1. "X" discussion handler
2. Holiday Party activities
3. GARS QSL card handler

In order to offer your help with any of these, send an email to president@gars.org or contact the President (Bob K4CQO) at one of our meetings.

Marketing Chair Information

The Gwinnett Amateur Radio Society (GARS) is seeking a volunteer to serve as Marketing Committee Chairman. This position is responsible for helping promote the club, its activities, and the benefits of amateur radio to current and prospective members.

Responsibilities include developing and coordinating marketing efforts for club events, membership recruitment, and special activities; assisting with social media and website promotion; and working closely with the Public Information Officer (PIO) to ensure consistent messaging and outreach.

The ideal candidate should have good communication skills, enjoy working with others, and have an interest in helping GARS grow and thrive. No professional marketing experience is required – just enthusiasm, creativity, and a willingness to help.

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New Membership: (Licensed Adults and Seniors who have never been a GARS member)	**First Year Free**	**Youth Membership: (Licensed Youth ≤ 21) (Proof of age required)**	**Free (until age 22)**
Adult Membership:	**$30 / 1-Year $50 / 2-Years ($10 savings) $60 / 3-Years ($30 savings) $350 / Lifetime (One-Time Fee)**	**Senior Membership: (Age 65+) (Proof of age required)**	**$15 / 1-Year $25 / 2-Years ($5 savings) $30 / 3-Years ($15 savings) $150 / Lifetime (One-Time Fee)**
Join Link: https://gars.org/join		**Renew Link: https://gars.org/renew**	

GARS Membership

New Members in June

Drew Commins (N4XOK)
David Kerr (K4GSR)
John Reichmann (KC9ZKS)
Carl Shropshire (KA5GUD)

New Members: 4

Total Members as of June 30, 2026
371

Join GARS members for our:

- weekly lunch bunch at 11:00 AM most Fridays
- weekly breakfast gathering at 8:00 AM most Saturdays

Friday weekly gatherings are held at the Chilli's at:

947 Lawrenceville Suwanee Rd, Lawrenceville, GA 30043

Saturday weekly gatherings are held at the Cracker Barrel at:

75 Celebration Dr, Suwanee, GA 30024

Birthdays in July

Becky Bentley (KK4SWI)
Warren Cameron (KM4FQH)
Bill Cherepy (WB4WTN)
Bill Cohl (WB2PIH)
Jeff Cutchins (AB4HF)
Juan Dominguez
Steven Francis (KQ4DSI)
Diane Gibson (N3MAD)
Alan Gideon (K5AKG)
Jon Guidry (K5JDG)
Ed Henderson (W4BSR)
Bob Hoffmann (K4CQO)
Frank Hummel (KO4MRQ)
Alan Janssen (K4APJ)
Brian Jones (KD4UYP)
Terry Jones (W4TL)
Paul Kelley (W4KLY)
Cathy Kelley (KN4DML)
Sherwin Levinson (K4SML)
Audrey Mc Elroy (KM4BUN)
Larry Osborne (WT4XX)
Bill Pierce (K1LP)
Stephen Schreiman (KJ4MWF)
Frank Settle (KR4CIV)
Joseph Somers (KR4GVO)
Tee Stewart (KR4GKY)
Christian Stewart (KR4IPH)
Mark Vogt (KQ4GEL)
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Mary Ann Bazain, Emilee Guidry, Michel Palmeri
Vera Pound, Glenda Sandidge

GARS MEMBERSHIP

Your current GARS membership status is shown in the monthly newsletter e-mail towards the bottom of the message. To become a GARS member, or to renew your GARS membership, please visit our website – www.gars.org/gars/membership/. To make changes to your GARS membership (moved, new e-mail address, new phone number, etc.), please contact the Membership Chair at Email (https://gars.org/contact/) with any changes to your Membership information.

Membership Chair: Dave Bruse, W4DTR
Committee Members: Pam Brown KJ4RYV, John Aguirre KQ4EJV, Tee Stewart KR4GKY

ARRL MEMBERSHIP

To update your ARRL membership information, please visit their website - http://www.arrl.org.

Local Ham Radio Meetings

In order to find a local Ham Radio Club meeting near you, please visit http://www.arrl.org/find-a-club. Contact the club for meeting information.

Donating to GARS

Your GARS donation can be used for a certain purpose by donating to one of these funds:

- GARS SK Memorial Fund for Education (to remember and honor Silent Keys);
- GARS Scholarship Fund (Administered by the ARRL for awarding scholarships);
- GARS General Fund (any club purpose).

GARS has joined these rewards programs (a portion of every purchase you make through these merchants may be donated to GARS):

- Kroger Community Rewards program.

For more information on how to sign up for these rewards programs, or to donate to GARS, visit

https://gars.org/gars/donations-to-the-club

GARS on Social Media

Discord Request:
https://gars.org/discord

Groups.io:
https://gars.org/groups.io

Visit GARS on Facebook:
https://gars.org/facebook

Follow GARS on X:
https://gars.org/x

Join GARS on YouTube:
https://gars.org/youtube

GARS Mail Address:

GARS
P.O. Box 492531
Lawrenceville, GA 30049
https://gars.org

Officers

Bob Hoffmann, President K4CQO

Glen Wendt, Vice President W3WWT

Ralph Pickwick, Treasurer KJ4CNC

Michael Stewart, Secretary KI4FPR

Kevin Scott, Program Manager K4GTR

Managers and Committee Chairs

Dave Bruse, VE Team Leader , Membership Chair W4DTR

David Adcock, Webmaster KA4KKF

Ralph Pickwick, Education Chair KJ4CNC

Earl Whatley, Apparel Manager & Dacula Parade Co-Chair AF4FG

Michael Stewart, Activities – Dacula Parade Co-ChairKR4CVF

Mario Stewart, Public Information Officer KR4CUK

Bob Hoffmann, GARzette Editor K4CQO

Eddie Foust, Repeater Chair K4AIH

Mike Weathers, WAS / DXCC QSL Card Checker & Historian ND4V

Chuck McCord, Net Manager KK4TKJ

Steve Back, Technical / RFI Advisor WB2OGY

Dallas Mellichamp, Workshop Leader, Field Day Chair N4DDM

Edwin Henderson, Multimedia Chair W4BSR

Dallas Mellichamp, Georgia QSO Chair N4DDM

Neil Derryberry, Elmer Manager & IT Chair WD4NET

Edwin Henderson, TechFest Chair W4BSR

Open Winter Field Day Chair, Health and Wellbeing

Directors and Trustees

Joe Biddle, AD4PZ

Kyle Albritton, W4KDA

John Davis, WB4QDX

Bill Cherepy, WB4WTN W4GR Trustee

GARS Meeting Minutes

GARS General Meeting Minutes
June 9, 2026

This was our yearly Ice Cream Social held at the GARS Field Day location. The President, Bob Hoffmann K4CQO held a short meeting listing the current finances and encouraging all to attend the upcoming Field Day.

It was noted GARS Workshop was still taking place next week Tuesday and the door prize give-away was done before everyone delved into their ice cream Harold KI4FPR and Pam KJ4RYV provided for the group.

Workshop Minutes - June 16, 2026

Attendance: 22

Workshop: Field Day Preps

Presenter: Various

Brief Summary: This Workshop followed the GARS presentation of the same title

22 were in attendance for the Workshop. David KA4KKF followed up on the programming of the laptops that will be used for Field Day logging. Nailed down who will bring gas for the generators. Confirmed the rendezvous time to get the GARS trailer and bring it to Harbins Park.

Dave W4DTR brought in his Power Pole kit and demonstrated how and why we use Power Pole connectors. Plus, there were cookies, sodas, and coffee.

Elmers are always present at the GARS Workshops. Feel free to bring your questions to the Workshop. If your project is small enough to bring to the meeting, please let us know in advance so we can gather the necessary tools, test equipment, etc.

73 Dallas N4DDM
Workshop Chair

GARS Calendar Events

GARS Events Calendar for 2026

TechFest	February 21 2026
Winter Field Day	January 24-25 2026
Dog Show Fundraiser	March 25-29, 2026
Spring Technician HamCram	April 11&12 2026
Georgia QSO Party	April 11-12 2026
North metro area Fox Hunt	April 2026
Memorial Day Parade	May 25 2026
ARC/KARC Hamfest	June 2027
Field Day	June 27-28 2026
Summer General HamCram	July 25-26 2026
Fall Technician HamCram	October 2026
JOTA	October 2026
Stone Mt. Hamfest	October 30-31 2026
Holiday Party	December 2026

GARS Recurring Calendar

- 2nd Tuesday of the month at 7 pm (except December)
  Monthly Club Meeting
  690 Airport Rd, Lawrenceville, GA 30046
- 3rd Tuesday of the month at 7 pm (except December)
  Monthly Workshop
  690 Airport Rd, Lawrenceville, GA 30046
- 3rd Sunday of the Month at 3 pm
  GARS Ham Exam Session
  690 Airport Rd, Lawrenceville, GA 30046
- Every Monday at 7:30 pm: GARS Want, Swap, Sell, and Information Net on the GARS 147.075 MHz repeater
- Every Monday at 8:30 pm: ARES Training on the GARS 147.075 MHz repeater
- Every Thursday at 7:30 pm: GARS 440 Net on the GARS 442.325 MHz repeater
- Every Friday at 11:30 am, GARS Lunch at Chilli's
- Every Saturday at 8:00 am GARS Breakfast at Cracker Barrell

GARS Calendar for July 2026

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
			1	2 **7:30 PM 440 Net 442.325(+) / 442.100(+) MHz Tone 100**	3 **11:30 AM Lunch at Chili's**	4 **8:00 AM Breakfast at Cracker Barrel**
5	6 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	7 **7:00 PM Exec Meeting**	8	9 **7:30 PM 440 Net 442.325(+) / 442.100(+) MHz Tone 100**	10 **11:30 AM Lunch at Chili's**	11 **8:00 AM Breakfast at Cracker Barrel**
12	13 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	14 **7:00 PM Meeting EAA 690 Hangar**	15	16 **7:30 PM 440 Net 442.325(+) / 442.100(+) MHz Tone 100**	17 **11:30 AM Lunch at Chili's**	18 **8:00 AM Breakfast at Cracker Barrel**
19 **3:00 PM Ham Radio Exams, EAA 690 Hangar**	20 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	21 **7:00 PM Workshop Meeting EAA 690 Hangar**	22	23 **7:30 PM 440 Net 442.325(+) / 442.100(+) MHz Tone 100**	24 **11:30 AM Lunch at Chili's**	25 **8:00 AM Breakfast at Cracker Barrel** **GARS General HamCram EAA 690 Hangar**
26 **GARS General HamCram EAA 690 Hangar**	27 **7:30 PM 2M Net 147.075(+) MHz Tone 82.5**	28	29	30 **7:30 PM 440 Net 442.325(+) / 442.100(+) MHz Tone 100**		

Events – ARRL Contests / Hamfests

ARRL CONTESTING INFO

From ARRL Contest Calendar
> For more information click the links <

January 2026
1 Straight Key Night
3 Kids Day
3-4 RTTY Roundup
17-19 January VHF

February 2026
9-13 School Club Roundup
21-22 International DX – CW

March 2026
7-8 International DX– Phone

April 2026
19 Rookie Roundup – Phone

May 2026 (no ARRL Contests)

June 2026
6-7 International Digital Contest
13-15 June VHF
20 Kids Day
27-28 Field Day

July 2026
11-12 IARU HF World Championship

August 2026
1-2 222 MHz and Up Distance Contest
15-17 10 GHz & Up – Round 1
8-9 EME - 2.3 GHz & Up
16 Rookie Roundup – RTTY

September 2026
12-14 September VHF
5-6 EME - 2.3 GHz & Up
19-21 10 GHz & Up - Round 2

October 2026
TBD Collegiate QSO Party
31-Nov 1 EME - 50 to 1296 MHz
19-23 School Club Roundup

November 2026
7-9 Nov Sweepstakes–CW
28-29 EME - 50 to 1296 MHz
21-23 Nov Sweepstakes–Phone

December 2026
4-6 160 Meter
12-13 10 Meter
20 Rookie Roundup–CW

For more information:
http://www.arrl.org/contest-calendar

HAMFEST CALENDAR

[Please confirm the status of a Hamfest before making plans

07/10/2026 - 07/11/2026 Milton ARC Hamfest
Location: Milton, FL
Type: ARRL Hamfest
Sponsor: Milton Amateur Radio Club
Website: http://miltonarc.org

07/11/2026 - Cullman Amateur Radio Hamfest
Location: South Vinemont, AL
Type: ARRL Hamfest
Sponsor: Cullman Amateur Radio Club
Website: http://cullmanarc.com

07/11/2026 - Cullman Amateur Radio Hamfest
Location: South Vinemont, AL
Type: ARRL Hamfest
Sponsor: Cullman Amateur Radio Club
Website: http://cullmanarc.com

08/22/2026 - 08/23/2026 Huntsville Hamfest, ARRL Nation Convention
Location: Huntsville, AL
Type: ARRL Convention
Sponsor: Huntsville Hamfest, Inc.
Website: http://hamfest.org

08/22/2026 - TarcFest
Location: Tampa, FL
Type: ARRL Hamfest
Sponsor: Tampa Amateur Radio Club
Website: http://www.hamclub.org

09/19/2026 - Gadsden Hamfest 2026
Location: Gadsden, AL
Type: ARRL Hamfest
Sponsor: Gadsden Amateur Radio Club
Website: http://k4jmc.com

10/09/2026 - 10/10/2026 - Melbourne Hamfest
Location: Melbourne, FL
Type: ARRL Hamfest
Sponsor: Platinum Coast Amateur Radio Club
Website: http://hamfest@pcars.org

10/10/2026 - NOARC Annual Hamfest
Location: Crestview , FL
Type: ARRL Hamfest
Sponsor: North Okaloosa Amateur Radio Club
Website: https://w4aaz.org/noarc/

10/25/2026 - Wiregrass ARC - Fall Tailgate
Location: Headland, AL
Type: ARRL Hamfest
Sponsor: Wiregrass Amateur Radio Club
Website: http://w4dhn.org

11/07/2026 - EPARS Fall Hamfest
Location: Dade City, FL
Type: ARRL Hamfest
Sponsor: East Pasco Amateur Radio Society
Website: http://k4ex.org

For more information: www.arrl.org/hamfests-and-conventions-calendar. **When searching by division, use Southeastern: GA, AL, FL Delta: TN Roanoke: NC, SC**

GARS Ham Radio Exams & Results

Upcoming GARS Ham Radio Exams

GARS Exam Sessions are held the 3rd Sunday of the month – Exam fee: $14.00 cash

Preregistration is REQUIRED, Doors open at 2:45 pm, exams start promptly by 3:00pm. For more information and to preregister, please visit https://gars.org/exams/

GARS VE-Team
VEC: W5YI-VEC
EAA 690 Hangar
690 Airport Rd, Lawrenceville, GA 30046

GARS VE Team Leaders
E-mail: exams@gars.org.

June 2026 Results

The GARS VE Team exam session results from June 21st:

3 new Technicians:
- Mark S Clifton KR4MJO
- Stewart T Ewig KR4NDI
- Brendon Murphy KR4NEI

3 new Generals:
- Noelle E Conant W4WYF
- Gregory Pressley KR4EAG
- William S Skidmore KR4EAY

1 new Extra (passed both General & Extra exams):
- Roberto R Morales W4BZC

Special thanks to the Volunteer Examiners who made this exam session possible:

W4DTR - Dave Bruse
KM4SWL – Richard Kitz
WS3V - Bill Rudd
NG4H – Bill Beguhn

Thanks & 73, Bill Beguhn (Co-Team Lead)

Local Ham Radio Exams
In order to find an exam session near you, please visit http://www.arrl.org/exam_sessions/. Contact the information in the listing for further information.

MAINTAIN YOUR LICENSE
You can update your Amateur Radio license information with the FCC at their website for free - https://www.fcc.gov/wireless/universal-licensing-system. License renewal is subject to the $35 FCC fee.

GARS Supporters

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Contact will.c.carson@gmail.com

In order to have your ad included, contact editor@gars.org. Current ad prices per year are:

Business Card	$50
1/4 page	$125
1/2 page	$150
Full page	$200

For swap items, post and see items on GARS groups.io (https://groups.io/g/GARS).

Ready to take your Ham Radio Exam?

Go to https://GARS.org/exams/ to learn more, and to register for an upcoming exam session.

Have an idea for entry into the GARzette?

Send the article to editor@gars.org and be published in next month's GARzette.